

1    I CLAIM:

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3                   1.    The method of providing an LED array  
4    assembly, that includes:

5                   a)    providing a grid of electrical  
6    conductors,

7                   b)    providing light emitting diodes and  
8    locating the diodes in association with the grid and in  
9    electrical communication with the conductors that  
10   provide power for LED operation,

11                  c)    the grid operable to receive heat from  
12   the diodes during diode operation, and the grid  
13   configured for passing coolant fluid for transfer of  
14   heat to the fluid.

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17                  2.    The method of claim 1 wherein the  
18   electrical conductors are provided in the form of  
19   insulated metal wires that act as electrical and  
20   thermal conductors and that also serve as structural  
21   load conductors, for arrays of such diodes.

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24                  3.    The method of claim 1 wherein the wires  
25   are dielectrically coated.

1                   4.     The method of claim 1 wherein the  
2     conductors are provided in the form of woven wires.

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5                   5.     The method of claim 1 wherein the array  
6     has at least one of the following characteristics:

7                   i)     curvature

8                   ii)    complex shape

9                   iii)   compliant configuration

10                  iv)   flexibility.

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13                  6.     The method of claim 1 including  
14     effecting and/or guiding flow of coolant fluid through  
15     or along the array.

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18                  7.     The method of claim 1 wherein the grid  
19     is provided as a dark grid to increase viewing contrast  
20     with LEDs during their operation.

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1                   8.    The method of claim 1 including  
2   providing one of the following:

- 3                   i)    a substrate above which LEDs are  
4                        placed  
5                   ii) a superstrate associated with the  
6                        array and LEDs to provide  
7                        structural strength to the  
8                        assembly.

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11                   9.    The method of claim 1 including  
12   providing a first sheet facing the diodes, to pass  
13   light emitted by the diodes.

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16                   10.   The method of claim 9 including  
17   providing a second sheet at an opposite side of the  
18   diodes, the first and second sheets forming an  
19   enclosure within which coolant fluid is flowable.

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22                   11.   The method of claim 1 wherein the grid  
23   of electrical conductors is provided to include primary  
24   conductors extending generally in one direction, and  
25   secondary conductors extending generally in another  
26   direction, the LEDs being mounted on the primary

1 conductors, and having terminals extending to the  
2 secondary conductors for electrical association  
3 thereto.

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6 12. The method of claim 11 wherein the  
7 secondary conductors are configured to extend above  
8 and/or below the primary conductors.

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11 13. The method of claim 12 wherein the  
12 secondary conductors are provided to have one of the  
13 following:

- 14 i) substantial spacing therebetween to  
15 pass coolant fluid through the  
16 grid,  
17 ii) lack of substantial spacing  
18 therebetween, to pass coolant fluid  
19 parallel to the grid,  
20 iii) cross sections which are  
21 substantially less than the cross  
22 sections of primary conductors  
23 which support diodes,  
24 iv) junctions with diode wires.

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1                   14. The method of claim 1 wherein certain of  
2 the conductors include multiple wire strands.

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5                   15. The method of claim 1 including  
6 providing balls or beads and seating the balls or beads  
7 on the conductors to act as spacers.

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10                  16. The method of claim 1 including  
11 providing means displacing and conducting coolant to  
12 one side of the screen, to flow through or adjacent to  
13 the array assembly.

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16                  17. The method of claim 1 including  
17 providing a transparent panel extending in the path of  
18 light from the LEDs.

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21                  18. The method of claim 1 wherein each diode  
22 is provided to include a light emitter or emitters, a  
23 transparent container having a window area, the emitter  
24 supported within the container, and a reflector within  
25 the container to reflect emitted light toward said  
26 window.

1                   19. The method of claim 18 including  
2 providing an electrical lead or leads extending with  
3 helical configuration within the container to said  
4 emitter or emitters.

5

6

7                   20. The method of claim 19 wherein the lead  
8 or leads is or are formed to has or have a generally  
9 rectangular cross section, for stable support of the  
10 emitter or emitters.

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13                   21. The method of claim 18 including  
14 providing a metallic base carrying the container, and  
15 through which said lead or leads extend.

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18                   22. The method of claim 20 including  
19 providing said lead or leads include wires associated  
20 with a red and/or green and/or blue emitter.

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22

23                   23. The method of claim 18 wherein multiple  
24 of said diodes have their container windows facing in  
25 the same or selected directions.

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1                   24. The method of claim 23 wherein the  
2 diodes and array assembly define a display.

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5                   25. The method of claim 21 wherein said base  
6 is provided to have an edge portion defining a recess  
7 for reception of a support for the diode, allowing  
8 diode rotation about the support, and including  
9 effecting said rotation.

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12                   26. The method of claim 25 wherein said  
13 electrical conductors are provided to define a mesh,  
14 and multiple of said LED devices are carried by the  
15 mesh, with said recesses receiving portions of said  
16 conductors allowing rotation of the devices relative to  
17 the mesh.

18

19

20                   27. The method of providing a light emitting  
21 diode device, that includes

22                   i) providing an electrically  
23 energizable light emitter, or  
24 emitters;

25                   ii) providing a transparent container  
26 having a window;

1                   iii) supporting the emitter or emitters  
2                   within the container;  
3                   iv) and providing a reflector structure  
4                   within the container to reflect  
5                   emitted light toward said window.  
6  
7

8                   28. The method of claim 27 including  
9 providing an electrical lead or leads extending with  
10 helical configuration within the container to said  
11 emitter or emitters.  
12  
13

14                  29. The method of claim 27 wherein the lead  
15 or leads is or are provided to has or have a generally  
16 rectangular cross section, and to support the emitter  
17 or emitters.  
18  
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20                  30. The method of claim 27 including  
21 providing a metallic base carrying the container, and  
22 through which said lead or leads extend.  
23  
24  
25



1                   31. The method of claim 27 wherein said  
2 reflector structure is provided to include spaced  
3 reflecting walls, and a curved reflector supported  
4 between said walls.

5

6

7                   32. The method of claim 28 including  
8 providing said lead or leads to include wires  
9 associated with a red and/or green and/or blue emitter.

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12                   33. The method of claim 27 including  
13 providing multiple of said devices having their windows  
14 facing in a display direction or directions.

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17                   34. The method of claim 33 including  
18 providing display structure supporting said diode  
19 devices in a multiple diode display configuration.

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22                   35. The method of claim 30 wherein said base  
23 has is provided to have an edge portion defining a  
24 recess for reception of a support for the diode,  
25 allowing diode rotation about the support, and

1 including effecting said rotation to a selected diode  
2 display configuration.

3

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5           36. The method of claim 1 wherein certain of  
6 said conductors that provide power for diode operation  
7 are configured as first, second and third pairs of  
8 wires to transmit electrical energization to red, green  
9 and blue LED pixels, respectively.

10

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12           37. The method of claim 36 wherein each LED  
13 has primary, secondary and tertiary wires electrically  
14 connected to the red, green and blue pixels,  
15 respectively, said primary wire configured to be clamp  
16 connected to said first pair of wires, said secondary  
17 wire configured to be clamp connected to said second  
18 pair of wires, and said tertiary wire configured to be  
19 clamp connected to said third pair of wires.

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22           38. The method of claim 37 including  
23 locating said three pairs of wires about a central  
24 region, and said LED primary, secondary and tertiary  
25 wires are respectively nested between said three pairs  
26 of wires, there being a retainer acting to clamp said

1 primary, secondary and tertiary wires in nested  
2 position.  
3  
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5 39. The method of claim 38 wherein said  
6 certain conductors are located to extend at an acute  
7 angle or angles relative to others of said conductors,  
8 said certain conductors defining LED addressing  
9 conductors to selectively address LEDs on said others  
10 of the conductors.  
11  
12

13 40. The method of claim 39 wherein said  
14 acute angle or angles are approximately 45°.   
15  
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17 41. The method of claim 1 including  
18 providing protective means at one of the following:  
19 i) at the front of the grid;  
20 ii) at the rear of the grid;  
21 iii) at both the front and rear of the  
22 grid.  
23  
24

1                   42. The method of claim 1 wherein said  
2 protective means is provided to include at least one  
3 metallic plate.

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6                   43. The method of claim 42 wherein said  
7 metallic plate is characterized by one of the  
8 following:

9

$x_1$ ) forming air passing openings;

10

$x_2$ ) forming air passing louvers;

11

$x_3$ ) forming air passing through slits.

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14                   44. The method of claim 42 wherein said  
15 protective means is provided in the form of a metallic  
16 screen or screens.

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19                   45. The method of claim 1 wherein the diodes  
20 are removably supported by the grid.

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23                   46. The method of claim 1 characterized by  
24 at least one of the following:

25

i) diode emission control electronics

26

provided within diode packages

1                   ii) diode emission control electronics  
2                   provided at or proximate an edge or  
3                   edges of the grid.  
4  
5

6                   47. The method of claim 1 including  
7 providing a light reflecting mirror or mirrors in  
8 association with a diode or diodes.  
9

10  
11                   48. The method of claim 47 wherein said  
12 mirror or mirrors is or are provided in the form of one  
13 or more of the following:

14                   i) a parabolic mirror  
15                   ii) dual mirrors within a package  
16                   iii) a parabolic trough forming mirror  
17                   or mirrors.  
18  
19

20                   49. The method of claim 1 including  
21 providing a conduit for extensions of the conductors,  
22 outside the grid.  
23  
24

1                   50. The method of claim 49 including  
2 providing spring tension exerting means acting on the  
3 conduit.

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6                   51. The method of claim 49 including  
7 providing holders about which end portions of the  
8 conductors in the grid are looped, the holders provided  
9 in association with the conduit.

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12                   52. The method of claim 1 wherein the diodes  
13 are provided in the form of packages having adjustable  
14 operative connection to the conductors characterized by  
15 one of the following:

16                   i) rotatable adjustability about one  
17 axis

18                   ii) rotatable adjustability about two  
19 axes.

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22                   53. The method of claim 52 wherein the  
23 diodes packages in the array are provided to have  
24 different positions of adjusted angularity.

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1                   54. The method of providing and LED array  
2 assembly that includes:  
3                   a) providing a grid of electrical  
4 conductors,  
5                   b) providing light emitting diodes and  
6 locating the diodes in association with the grid and in  
7 electrical communication with the conductors that  
8 provide power for LED operation,  
9                   c) and providing LED structure allowing  
10 rotary adjustment of at least some LEDs relative to  
11 conductors on which those LEDs are supported.

12

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14                   55. The method of claim 54 wherein said  
15 rotary adjustment is characterized by one of the  
16 following:

- 17                   i) rotation about an axis or axes  
18                   defined by the LED or LEDs  
19                   ii) rotation about a conductor axis or  
20                   axes  
21                   iii) rotation about both i) and ii)  
22                   above.

23

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1                   56. The method of claim 54 including  
2 providing clip means positioning the conductors  
3 relative to which the LEDs are rotatably adjustable.

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7                   57. The method that includes:

8                   a) providing multiple LEDs in a display  
9 array, and

10                  b) selectively electrically energizing the  
11 LEDs in the array to adjust the display,

12                  c) cooling the display array.

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15                  58. The of claim 57 including selectively  
16 adjusting the positioning of the LEDs in the array.

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